

5

What is claimed is:

10

1. A through-the-earth communication system comprising:

an audio signal input device;

a transmitter operating at a predetermined frequency sufficiently low to effectively penetrate useful distances through-the earth, and having an

15

analog to digital converter receiving said audio signal input and passing said audio signal input to a data compression circuit whose output is connected to an encoding processor, said encoding processor output being provided to a digital to analog converter;

20

an amplifier receiving analog output from said digital to analog converter for amplifying said analog output and outputting said analog output to an antenna;

25

a receiver having an antenna receiving said analog output and passing said analog output to a band pass filter being connected to an analog to digital converter that provides a digital signal to a decoding processor whose output is connected to an data decompressor, said data decompressor providing a decompressed digital signal to a digital to analog converter; and

30

an audio output device receiving analog output form said digital to analog converter for producing audible output.

35

2. The apparatus as described in Claim 1 wherein said audio signal input device is a microphone.

3. The apparatus as described in Claim 1 wherein said antenna is a loop antenna.

5

4. The apparatus as described in Claim 1, wherein said encoding processor operates using quadrature phase shift keying.

10

5. The apparatus as described in Claim 1, wherein said encoding processor operates using a QAM-16 processor.

6. The apparatus as described in Claim 1, wherein said predetermined frequency is approximately 7 kHz.

15

7. The apparatus as described in Claim 1, wherein said predetermined frequency is approximately 4 kHz.

8. The apparatus as described in Claim 1, wherein said band pass filter is of the wideband 4-pole elliptic design.

20

9. The apparatus as described in Claim 1, wherein said antenna is a SQUID detector connected to a flux locked loop.

25

10. A through-the-earth communication system comprising:

a digital signal input device;

a transmitter operating at a predetermined frequency sufficiently low to effectively penetrate useful distances through-the earth, receiving said digital signal input and providing said digital input signal to a data compression circuit that is connected to an encoding processor;

30

an amplifier receiving encoded output from said encoding processor for amplifying said encoded output and outputting said encoded output to an antenna;

a receiver having an antenna receiving said encoded output followed by a band pass filter being connected to a decoding processor whose

5 output is connected to an data decompressor, said data decompressor
 providing a decompressed digital signal.

11. The apparatus as described in Claim 10, wherein said digital signal
10 Input device is a digital video camera.

12. The apparatus as described in Claim 10, wherein said antenna is a
 loop antenna.

13. The apparatus as described in Claim 10, wherein said encoding
15 processor operates using quantum phase shift keying.

14. The apparatus as described in Claim 10, wherein said encoding
 processor operates using a QAM-16 processor.

15. The apparatus as described in Claim 10, wherein said predetermined
20 frequency is approximately 4 kHz.

16. The apparatus as described in Claim 10, wherein said predetermined
 frequency is approximately 7 kHz.

17. The apparatus as described in Claim 10, wherein said band pass filter
25 is of the wideband 4-pole elliptic design.

18. The apparatus as described in Claim 1, wherein said antenna is a
30 SQUID detector connected to a flux locked loop.

19. A method of conducting through-the-earth communication comprising
 the steps of:

 inputting an analog signal;
35 digitizing said analog signal;

5 compressing said digitized signal;
 encoding said compressed digitized signal to encode a predetermined
data stream into said compressed digitized signal; and
 outputting said encoded compressed digitized signal through an
antenna at a predetermined frequency that is sufficiently low to effectively
10 penetrate useful distances through-the-earth as a transmitted signal;
 receiving said transmitted signal with an antenna after said transmitted
signal has propagated through-the-earth;
 converting said transmitted signal from an analog signal to a digital
signal:
15 decoding said digital signal;
 decompressing said digital signal; and
 outputting said decoded decompressed digital signal.

20 20. The method as described in Claim 19, where said antenna comprises
a SQUID detector followed by a flux locked loop.

21. The method as described in Claim 19, wherein said step of outputting
said decoded decompressed digital data further comprises outputting to a
speaker.

25 22. The method as described in Claim 19, wherein said step of outputting
said decoded decompressed digital data includes outputting an audio
signal.

30 23. The method as described in Claim 19, wherein said step of inputting
an analog signal is accomplished by use of a microphone.

35